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600 Technology Park Drive
Billerica, MA 01821-4130

Nortel VPN Router Installation — VPN Router 600

NORTEL

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European requirements only

EN 55 022 statement

This is to certify that the Nortel Networks VPN Router 600 is shielded against the generation of radio interference in accordance with the application of Council Directive 89/336/EEC, Article 4a. Conformity is declared by the application of EN 55 022 Class A (CISPR 22).

Warning: This is a Class A product. In a domestic environment, this product may cause radio interference, in which case, the user may be required to take appropriate measures.

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Règlement sur le brouillage radioélectrique du ministère des Communications

Cet appareil numérique (VPN Router 600) respecte les limites de bruits radioélectriques visant les appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique du ministère des Communications du Canada.

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New in this release

The following section details what's new in *Nortel VPN Router Installation—VPN Router 600* (NN46110-308) for Release 7.05.300:

Features

See the following section for information about feature changes:

1000BASE-T (1000 GT) Ethernet card

The 100 GT Ethernet card replaces the 10/ 100BASE-TX Ethernet card. See "1000BASE-T (1000 GT) Ethernet interface card LEDs" on page 37 and "1000BASE-T (1000 GT) Ethernet interface card" on page 77.

How to get help

This chapter explains how to get help for Nortel products and services.

Finding the latest updates on the Nortel Web site

The content of this documentation was current at the time the product was released. To check for updates to the latest documentation and software for the VPN Router 600, go to:

www.nortel.com/support

Select Security & VPN and then, in the section called Virtual Private Networking (VPN), IPSEC, and SSL, click the appropriate VPN Router product.

Getting help from the Nortel Web site

The best way to get technical support for Nortel products is from the Nortel Technical Support Web site:

www.nortel.com/support

This site provides quick access to software, documentation, bulletins, and tools to address issues with Nortel products. From this site you can:

- download software, documentation, and product bulletins
- search the Technical Support site and the Nortel Knowledge Base for answers to technical issues
- sign up for automatic notification of new software and documentation for Nortel equipment
- open and manage technical support cases

Getting help over the phone from a Nortel Solutions Center

If you do not find the information you require on the Nortel Technical Support Web site, and you have a Nortel support contract, you can also get help over the phone from a Nortel Solutions Center.

In North America, call 1-800-4NORTEL (1-800-466-7835).

Outside North America, go to the following Web site to obtain the phone number for your region:

www.nortel.com/callus

Getting help from a specialist by using an Express Routing Code

To access some Nortel Technical Solutions Centers, you can use an Express Routing Code (ERC) to quickly route your call to a specialist in your Nortel product or service. To locate the ERC for your product or service, go to:

www.nortel.com/erc

Getting help through a Nortel distributor or reseller

If you purchased a service contract for your Nortel product from a distributor or authorized reseller, contact the technical support staff for that distributor or reseller.

Preface

The VPN Router 600 is part of the Nortel VPN Router product family. Nortel VPN Routers support secure, reliable IP VPNs in a single, integrated hardware device. Throughout this guide, the VPN Router 600 is also referred to as the *gateway*.

This guide provides instructions on how to install and start the VPN Router 600 and how to install and replace option cards and the dual inline memory module (DIMM). This guide also provides some initial configuration information and includes technical specifications for the gateway.

For complete information about configuring and monitoring the VPN Router 600, see the documentation on the software CD. (For information about VPN Router documentation, see "Related publications" on page 23.)

Before you begin

This guide is intended for qualified service personnel who are installing the VPN Router 600 for the first time or who need to install or replace the following field replaceable units (FRU):

- LAN, WAN, and serial option cards
- Dual inline memory module (DIMM)

Before you install the VPN Router 600, use standard cable system practices to install all the network wiring on the premises.

Text conventions

This guide uses the following text conventions:

bold Courier text	Indicates command names and options and text that you need to enter. Example: Use the **show health** command. Example: Enter **terminal paging** {**off** | **on**}.
italic text	Indicates new terms and book titles.
plain Courier text	Indicates system output, for example, prompts and system messages. Example: `File not found.`
separator (>)	Shows menu paths. Example: Choose Status > Health Check.

Acronyms

This guide uses the following acronyms:

ADSL	asymmetric digital subscriber line
AIS	alarm indication signal
BRI	Basic Rate Interface
CSU	channel service unit
DIMM	dual inline memory module
DSU	digital service unit
DTE	data terminal equipment
IP	Internet Protocol
IPsec	IP Security
ISDN	Integrated Services Digital Network
LAN	local area network
LED	light emitting diode

LOS	loss of signal
OOF	out of frame
PCI	peripheral component interconnect
URL	uniform resource locator
VPN	virtual private network
WAN	wide area network

Related publications

For complete information about configuring, monitoring, and managing the VPN Router 600, formerly known as the Contivity Secure IP Services Gateway 600, refer to the following publications:

- Release notes provide the latest information, including brief descriptions of the new features, problems fixed in this release, and known problems and workarounds.
- *Nortel VPN Router Configuration — Basic Features* (NN46110-500) introduces the product and provides information about initial configuration.
- *Nortel VPN Router Security — Servers, Authentication, and Certificates* (NN46110-600) provides instructions for configuring authentication servers and services, as well as digital certificates.
- *Nortel VPN Router Security — Firewalls, Filters, NAT, and QoS* (NN46110-601) provides instructions for configuring the VPN Router Stateful Firewall, NAT, and VPN Router interface and tunnel filters.
- *Nortel VPN Router Configuration — Tunneling Protocols*) (NN46110-503) provides instructions for configuring the tunneling protocols IPsec, L2TP, PPTP, and L2F.
- *Nortel VPN Router Configuration — Advanced Features* (NN46110-502) provides instructions for configuring 802.1Q VLANs, circuitless IP, advanced WAN settings, PPP, PPPoE, frame relay, ADSL and ATM, T1/E1 CSU/DSU interfaces, dial services and BIS, DLSw, IPX, and Hardware Accelerator cards.
- *Nortel VPN Router Configuration — Routing* (NN46110-504) provides instructions for configuring RIP, OSPF, and VRRP, as well as instructions for configuring ECMP, routing policy services, and client address redistribution.

- *Nortel VPN Router Configuration — SSL VPN Services* (NN46110-501) provides instructions for configuring services on the SSL VPN Module 1000, including authentication, networks, user groups, and portal links.
- *Nortel VPN Router Using the Command Line Interface* (NN46110-507) provides syntax, descriptions, and examples for the commands that you can use to configure, manage, and monitor the gateway.
- *Nortel VPN Router Troubleshooting* (NN46110-602) provides information about backup and recovery, file management, upgrading software, and troubleshooting. This guide also provides instructions for monitoring gateway status and performance.
- *Nortel VPN Router Configuration — Tunnel Guard* (NN46110-307) provides information about configuring and using the TunnelGuard feature.

Printed technical manuals

You can print selected technical manuals and release notes free, directly from the Internet. Go to www.nortel.com/documentation, find the product for which you need documentation, then locate the specific category and model or version for your hardware or software product. Use Adobe Reader to open the manuals and release notes, search for the sections you need, and print them on most standard printers. Go to Adobe Systems at www.adobe.com to download a free copy of the Adobe Reader.

Chapter 1
Introducing the Nortel VPN Router 600

This chapter describes the VPN Router 600 and how to install it.

Note: Before you install the chassis, use standard cable system practices to install all network wiring on the premises.

This chapter contains the following topics:

Topic	Page
Description of the Nortel VPN Router 600	25
Preparing to install the Nortel VPN Router 600	26
Installing the chassis	28

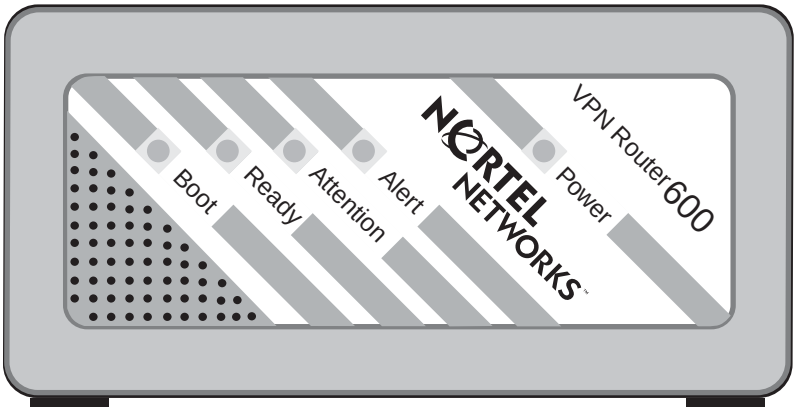
Description of the Nortel VPN Router 600

The VPN Router 600 enables scalable, secure, and robust IP virtual private networks (VPNs) for up to 50 simultaneous users across the public data network. The VPN Router 600 is for branch offices and small businesses that need to be interconnected through managed Internet Protocol (IP) VPNs.

The VPN Router 600 provides routing, firewall, bandwidth management, encryption, authentication, and data integrity services to ensure secure tunneling across IP networks and the Internet. An individual user or group of users can be associated with a set of attributes that provide custom access to an extranet.

Figure 1 shows the front view of the VPN Router 600.

Figure 1 Front view of the VPN Router 600



The VPN Router 600 chassis provides the following:

- Two 10/100 Ethernet LAN ports on the base system
- One serial port for out-of-band management of the VPN Router 600
- One expansion PCI slot that can contain an optional interface card
- One 128 MB dual inline memory module (DIMM)

Preparing to install the Nortel VPN Router 600

Before you install the VPN Router 600, verify that:

- Your shipment is complete and undamaged.
- You have the cables that you need.
- Your installation site meets the physical, electrical, and environmental requirements.

The sections that follow provide information to help you prepare for installation.

Shipment contents

In addition to the gateway and this guide, the shipping container for the VPN Router 600 contains a number of hardware accessories and other items.

Note: Nortel does not ship a power cord with the VPN Router 600 unless you order one.

Table 1 lists the hardware accessories and other items shipped with the gateway.

Table 1 Items shipped with the Nortel VPN Router 600

Quantity	Item	Description
1	Molded serial cable DB9/DB25-to-DB9/DB25	Used to connect the VPN Router 600 to a PC or to a local terminal
1	AC-to-DC external power supply pack	Provides power to the VPN Router 600
1	*Important Notice for the VPN Router 600*	Provides shorter instructions for installing the chassis
1	VPN Router software kit	Contains VPN Router software and documentation (including this book) on CD
1	VPN client kit	Contains VPN Client software and documentation on CD

Inspect all items for shipping damage. If you detect any damage, do not install the VPN Router 600. Call the Nortel Technical Solutions Center in your area (see "How to get help" on page 17).

Cables

You need cables that are not included in the VPN Router 600 shipping container. For information about which cables are shipped and which ones you can order, see "Connecting communications cables VPN Router 600" on page 30. If you do not have the proper cables, contact your network administrator.

Site requirements

The installation site must provide sufficient free space around the VPN Router 600 to ensure proper ventilation and access for servicing. For information about the physical, electrical, and environmental requirements for the VPN Router 600, see "Chassis specifications" on page 71.

Installing the chassis

To install the VPN Router 600, position the chassis on a flat, sturdy, horizontal surface. Make sure that the surface is large enough for the gateway and sturdy enough to support the combined weight of the VPN Router 600 and the cables that you attach to it.

Chapter 2
Cabling the VPN Router and turning the power on

This chapter provides information about how to connect communications cables and the power cord to the VPN Router 600.

Caution: Connect the cables to the built-in Ethernet ports and to the interfaces on the optional interface card installed in the VPN Router 600 before you plug the power cord into the outlet.

This chapter contains the following topics:

Topic	Page
Connecting communications cables VPN Router 600	30
Connecting the power cord	32
Understanding the LEDs	33

Caution: Route the cable for all WAN, LAN, and serial connections inside the building environment.

Connecting communications cables VPN Router 600

Gather the cables that you must attach to the VPN Router 600.

Table 2 lists the system ports and the ports provided on the optional interface cards that you can install in the VPN Router 600. The table also indicates whether you can obtain cables for the ports from Nortel.

Table 2 Interfaces and cables for the VPN Router 600

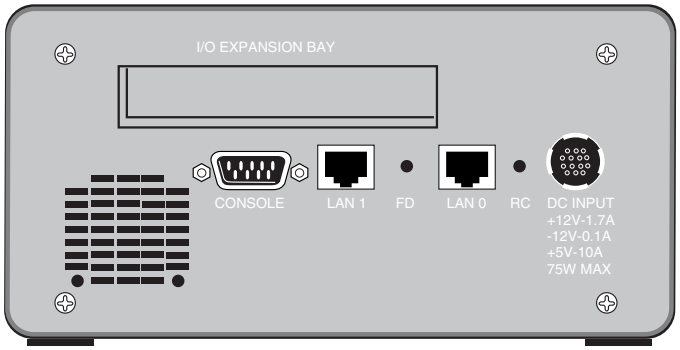
	Cable available from Nortel		
Interface	**Included**	**Ordered separately**	**Contact supplier**
10/100BASE-TX Ethernet system port			X
Serial port	X		
10/100BASE-TX Ethernet			X
1000BASE-T (1000 GT) Ethernet			X
56/64K CSU/DSU WAN			X
ADSL WAN	X		
ISDN BRI			X
V.90 modem	X		
T1/E1 CSU/DSU WAN			X
Single V.35/X.21 WAN		X[1]	

1 Order either the V.35 cable or the X.21 cable.

For information about the connectors and cable pinouts, see Appendix A, “Technical specifications,” on page 71.

Figure 2 on page 31 shows the back of the VPN Router 600. All interface cables and the power cord attach to the rear of the gateway.

Figure 2 Rear view of the VPN Router 600



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Connect the interface cables to the VPN Router 600 in this order:

1. Connect the 10/100BASE-TX RJ-45 cables to the built-in 10/100BASE-TX Ethernet LAN ports on the gateway (Figure 2).
2. Connect the serial cable shipped with the VPN Router 600 to the serial port (Figure 2), if you plan to connect a terminal or PC to the gateway.
3. Connect the appropriate cables to the ports on the installed interface card.

   If you ordered optional interface cards, connect the cables for these interfaces to the ports.

Connecting the power cord

You must order the power cord for the VPN Router 600 separately.

Caution: Risk of equipment damage
Do not modify or use the AC power cord if it is not the exact type that is required for your power outlet.

The power cord must meet the requirements described in Table 3.

Table 3 Power cord requirements

Requirement	Description
Current rating	The power cord must be rated for the available AC voltage and must have a current rating that is at least 125 percent of the gateway's current rating (100—240 VAC).
Certification	The power cord must have certification marks from an acceptable regional agency.
Cord length and flexibility	The power cord must be less than 4.5 meters (14.7 feet) long. It must be a flexible HAR (harmonized) cord or VDE-certified cordage to comply with the gateway's safety certifications.
Power supply connector	The connector that you plug into the AC receptacle on the VPN Router 600 power supply must be an IEC 320, Sheet C13 female.
Wall outlet connector	The power cord must terminate in a male plug with appropriate grounding.

To connect the power cord and turn on the system power:

Caution: Before you connect the power supply to the gateway, connect the cables to the Ethernet and serial ports and to the ports on the installed option card.

1 Plug the cable attached to the external power pack into the receptacle labeled "DC Input" on the rear of the VPN Router 600 (Figure 2 on page 31).

Locate the word "top" on the plug end of the cable and align that part of the cable with the arrow printed above the DC input port.

2 Plug the female end of the power cord into the external power supply pack.

3 Plug the male end of the power cord into a surge protector.

Caution: Risk of equipment damage
Protect the VPN Router 600 by plugging it into a surge suppressor.

4 Plug the surge protector (or the power cord) into the power outlet.

The VPN Router 600 should begin to boot.

Note: The VPN Router 600 has no power switch. Connecting the VPN Router 600 to a power supply turns the gateway on.

5 Verify a successful installation by checking the LEDs on the front panel (see "Front panel LEDs" on page 34).

If the Ready LED does not turn green (to indicate that the gateway has booted successfully), check that you properly attached the power cord to the power supply pack and to the power outlet.

If the VPN Router 600 still does not boot, contact your local Nortel Technical Solutions Center (see "How to get help" on page 17).

Understanding the LEDs

This section describes the LEDs on the front panel of the VPN Router 600 and on the interface cards that have LEDs. You can confirm that the LAN and WAN interfaces are cabled properly by examining the LEDs.

Front panel LEDs

The front panel of the VPN Router 600 has five LEDs (Figure 3). These LEDs indicate the status of the VPN Router 600.

Figure 3 Front panel LEDs

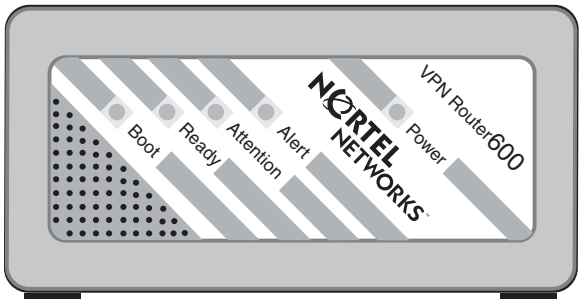


Table 4 describes the LEDs on the VPN Router 600 front panel.

Table 4 Front panel LED indicators

LED	Indicator	Description
Power	On	The gateway is receiving DC power.
	Off	The gateway is not receiving DC power.
Alert	Red	A serious alarm condition exists that requires attention. A red alert usually indicates a hardware error. The red alert condition is described in the health check display.
Attention	Amber	A non-fatal alarm condition exists. The yellow alert condition is described in the health check display.
Ready	Green	The gateway has booted and is operational.
Boot	Amber	The gateway is booting and is in a non-ready state. If the Boot LED and the Ready LED light at the same time, the VPN Router 600 is in recovery mode (see Chapter 5, “Using recovery mode,” on page 65).

For complete information about the health check, event log, and system log, see *Nortel VPN Router Troubleshooting* (NN46110-602).

LEDs on the system 10/100BASE-TX Ethernet ports

Figure 4 shows the LEDs for the 10/100BASE-TX Ethernet ports located on the rear of the VPN Router 600.

Figure 4 LEDs on the system 10/100BASE-TX Ethernet port

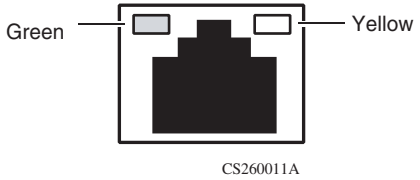


Table 5 describes the LEDs on the system 10/100BASE-TX Ethernet ports.

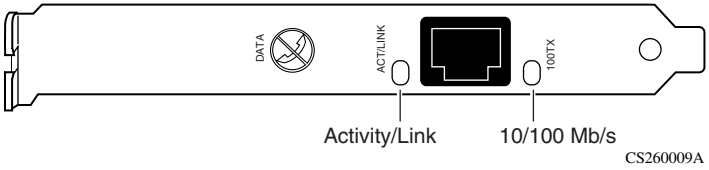
Table 5 LED indicators on the system 10/100BASE-TX Ethernet port

LED	Indicator	Description
Green	On	The LAN port is operating at 100 Mb/s.
	Off	The LAN port is operating at 10 Mb/s.
Yellow	On	The cable connections between the LAN port and the hub are good.
	Off	The cable connections between the LAN port and the hub are faulty.
	Flashing	The LAN port is sending or receiving network data. The frequency of the flashes increases with increased traffic.

10/100BASE-TX Ethernet interface card LEDs

Figure 5 shows the LEDs on the 10/100BASE-TX Ethernet interface card.

Figure 5 LEDs on the 10/100BASE-TX Ethernet interface card



The following describes the LEDs on the 10/100BASE-TX Ethernet interface card.

Table 6 LED indicators on the 10/100BASE-TX Ethernet interface card

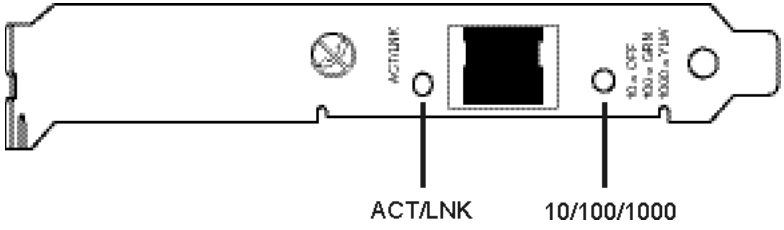
LED	Indicator	Description
ACT/LINK	Steady Green or Flashing Green	The card is sending or receiving network data. The frequency of the flashes increases with increased traffic.
	Off	The card is not sending or receiving data.
10/100TX	Green	The port is operating at 100 Mb/s.
	Off	The port is operating at 10 Mb/s.

1000BASE-T (1000 GT) Ethernet interface card LEDs

The following figure shows the LEDs on the 10BASE-T/100BASE-TX/ 1000BASE-T Ethernet interface card.

Note: The 1000BASE-T (100 GT) Ethernet interface card can only operate at 10/100 Mbit/s on the VPN Router 600.

Figure 6 LEDs on the 1000BASE-T (100 GT) Ethernet interface card



The following table describes the LEDs on the1000BASE-T (100 GT) Ethernet interface card.

Table 7 LED indicators on the 1000BASE-T (100 GT) Ethernet interface card

LED	Indicator	Description
ACT/LINK	Steady green	The port is connected to a valid link partner.
	Flashing green	The card is sending or receiving network data. The frequency of the flashes increases with increased traffic.
	Off	The card is not sending or receiving data.
10/100/1000	Green	The port is operating at 100 Mb/s.
	Off	The port is operating at 10 Mb/s.

56/64K CSU/DSU WAN interface card LEDs

Figure 7 shows the LEDs on the 56/64K CSU/DSU WAN interface card.

Figure 7 LEDs on the 56/64K CSU/DSU WAN interface card

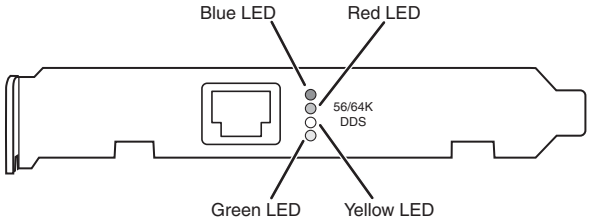


Table 8 describes the LEDs on the 56/64K CSU/DSU WAN interface card.

Table 8 LED indicators on the 56/64K CSU/DSU WAN interface card

LED	Description
Blue	The blue alarm LED is lit when receiving an upstream failure denoted by an alarm indication signal (AIS).
Red	The red alarm LED is lit when a loss-of-signal (LOS) or out-of-frame (OOF) condition is detected on the receive signal.
Yellow	The yellow alarm LED is lit when the far-end equipment is in the red alarm condition.
Green	The green LED is lit when the condition is normal operation.

ADSL WAN interface card LEDs

Figure 8 shows the LEDs on the ADSL WAN interface card.

Figure 8 LEDs on the ADSL WAN interface card

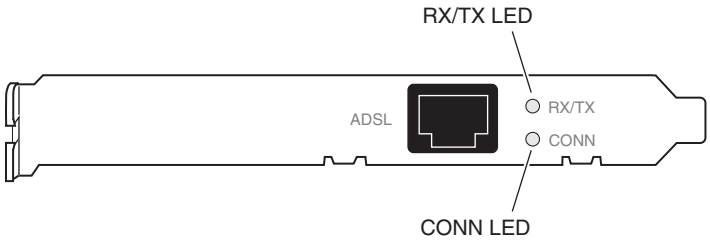


Table 9 describes the LEDs on the ADSL WAN interface card.

Table 9 LED indicators on the ADSL WAN interface card

CONN LED	Tx/Rx LED	Description
Steady green	Steady green	The ADSL interface card is not initialized; the software driver is not installed.
Off	Off	The ADSL interface card is initialized, but has not established a link with the ADSL network.
Flashing green	Off	The ADSL interface card is attempting to establish a link with the ADSL network.
Steady green	Off	The ADSL interface card has established a link with the ADSL network.
Steady green	Flashing green	The ADSL interface card is sending or receiving network data. (The LED can be dim.)

T1/E1 CSU/DSU WAN interface card LEDs

Figure 9 shows the LEDs on the T1/E1 CSU/DSU WAN interface card.

Figure 9 LEDs on the T1/E1 CSU/DSU WAN interface card

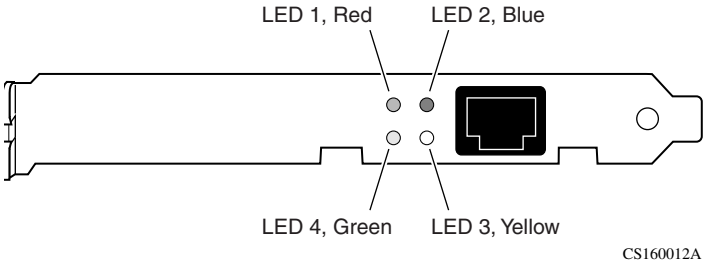


Table 10 describes the LEDs on the T1/E1 CSU/DSU WAN interface card.

Table 10 LED indicators on the T1/E1 CSU/DSU WAN interface card

LED	Indicator	Description
LED 1	Red	The red alarm LED is lit when a loss-of-signal (LOS) or out-of-frame (OOF) condition is detected on the receive signal.
LED 2	Blue	The blue alarm LED is lit when receiving an upstream failure denoted by an alarm indication signal (AIS).
LED 3	Yellow	The yellow alarm LED is lit when the far-end equipment is in the red alarm condition.
LED 4	Green	The green LED is lit when the condition is normal operation.

Single V.35/X.21 WAN interface card LEDs

Figure 10 shows the LEDs on the single V.35/X.21 WAN interface card.

Figure 10 LEDs on the single V.35/X.21 WAN interface card

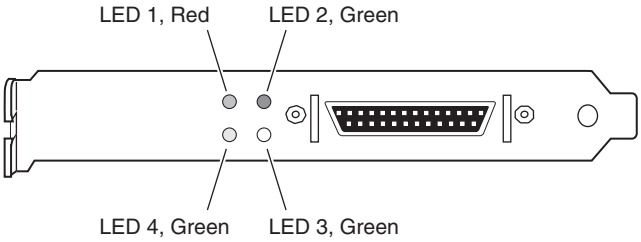


Table 11 describes the LEDs on the single V.35/X.21 WAN interface card.

Table 11 LED indicators on the single V.35/X.21 WAN interface card

LED	Indicator	Description
LED 1	Red	No external transmit clock source is available.
LED 2	Green	The signals CDC and DSR are on between the DSU and the adapter. LED 2 detects receive link status.
LED 3	Green	Power to the adapter is on and the onboard microcode is loaded.
LED 4	Green	Cable is detected.

Chapter 3
Configuring the management IP interface

This chapter describes how to configure a management IP address, subnet mask, and default gateway address on a newly installed VPN Router 600. After you complete the procedures in this chapter, you can configure and manage the VPN Router 600 using a Web browser from a PC.

To configure the management IP address, you use the serial interface configuration menu. You must connect a PC or terminal to the serial port on the VPN Router 600.

This chapter contains the following topics:

Topic	Page
Required information	44
Configuring the management IP address	48
Testing the configuration	49
Troubleshooting	50

Required information

Before you configure the management interface, collect this information:

- IP address for the management interface

  The management IP address must be accessible from one of the private physical interfaces on the VPN Router 600. For example, if you plan to assign IP address 10.2.3.3 with subnet mask 255.255.0.0 to the private physical interface, the management IP address must reside in the 10.2 network.

- Subnet mask

  The subnet mask specifies which IP addresses are directly reachable on the network and which ones must be routed through a gateway. For example, the IP address 10.2.3.3 with a subnet mask of 255.255.0.0 indicates that all hosts with addresses 10.2.*n*.*n* are directly reachable.

- Default gateway (optional)

  The default gateway routes packets to destinations for which there is no specific route in the routing table. You can configure a default gateway when you assign the management IP address, or you can configure it at a later time.

Note: Write down and save the management IP address. You need it to configure the VPN Router 600.

Configuring the management IP address

You use the serial interface to assign the VPN Router 600 a management IP address and subnet mask so that you can then use a Web browser for management.

To configure the management IP address using the serial interface:

1. Turn on the terminal or PC.

   The terminal or PC should be configured as follows:

   - 9600 baud
   - 8 data bits
   - 1 stop bit
   - No parity
   - No flow control

2. Connect the serial cable (supplied with the VPN Router 600) from the gateway's serial port to a terminal or to the communications port on a PC.

3. On the PC, start HyperTerminal or another terminal emulation program, and press **Enter**.

   The Nortel VPN Router screen appears.

```
Nortel VPN Router
Copyright (c) 1999-2005 Nortel Networks, Inc.

Version:              V07_0.024
Creation date:        Jul 6 2006, 08:23:16
Unit Serial Number:   510649

Please enter the administrator's user name:
```

4. Enter the default user name and password for the administrator.

   The factory default user name is *admin* and the default password is *setup*. The user name and password are case sensitive.

```
Please enter the administrator's user name: admin

Please enter the administrator's password: *****
```

The serial main menu appears.

```
Main Menu: System is currently in NORMAL mode.

   0) Management Address
   1) Interfaces
   2) Administrator
   3) Default Private Route Menu
   4) Default Public Route Menu
   5) Create A User Control Tunnel (IPsec) Profile
   6) Restricted Management Mode          FALSE
   7) Allow HTTP Management               TRUE
   8) Firewall Options
   9) Shutdown
   B) System Boot Options
   P) Configure Serial Port
   C) Controlled Crash
   L) Command Line Interface
   R) Reset System to Factory Defaults
   E) Exit, Save and Invoke Changes

Please select a menu choice (0 - 9,B,P,C,L,R,E):
```

5 To configure the Interface IP address from the serial menu, type **1**, and press **Enter**.

The interface menu appears.

```
- Interface Menu

0) Slot 0, Port 2, Public LAN
     IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

1) Slot 0, Port 1, Private LAN
     IP Address =192.167.120.14
     Subnet Mask = 255.255.255.0
     Speed/Duplex = AutoNegotiate

R) Return to the Main Menu.

Please select a menu choice:
```

6 Type **0**, and press **Enter** to configure the IP address.

The IP address prompt appears.

```
0) Slot 0, Port 2, Public LAN
     IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

*Type 0.0.0.0 to delete.
*Just type <CR> to skip.
   Old IP address =
   New IP address =
```

7 Type a new IP address, and press **Enter**.

The subnet mask prompt appears.

```
Old Subnet Mask = 0.0.0.0

New Subnet Mask =
```

8 At the New Subnet Mask prompt, type the subnet mask for the management IP address, and press **Enter**.

The Speed/Duplex prompt appears.

9 Press **Enter** to leave the speed and duplex settings unchanged.

The Interface menu appears again with the changes you made.

```
0) Slot 0, Port 2, Public LAN
     IP Address =
     Subnet Mask = 0.0.0.0
     Speed/Duplex = AutoNegotiate

1) Slot 0, Port 1, Private LAN
     IP Address =192.167.120.14
     Subnet Mask = 255.255.255.0
     Speed/Duplex = AutoNegotiate

R) Return to the Main Menu.

Please select a menu choice:
```

Type **R**, and press **Enter** to return to the serial main menu.

10 To configure the management IP address, type **0** and press **Enter**.

The Management IP Address menu appears.

```
- Management IP Address Menu

M) Management IP Address =
R) Return to the Main Menu

Please select a menu choice (M,R):
```

11 Type **M**, and press **Enter**.

The Management IP Address prompt appears.

```
*Type 0.0.0.0 to delete.
*Just type <CR> to skip.
   Old management IP address =
   New management IP address =
```

12 Type the new management IP address, and press **Enter** to configure the management IP address.

The new IP management address appears in the Management IP Address menu.

```
- Management IP address menu

M) Management IP Address =192.167.120.13
R) Return to the Main Menu

Please select a menu choice (M,R):
```

13 Type **R**, and press **Enter** to return to the serial main menu.

The serial main menu appears.

14 From the serial main menu, type **E**, and press **Enter** to save the new management IP address and mask, and to exit the serial menu.

15 Go to the next section, "Testing the configuration" on page 49, to verify that you can access the VPN Router 600 from a Web browser.

For detailed information about configuring and managing the VPN Router 600, refer to the documentation on the VPN Router software CD.

Testing the configuration

After you assign a management IP address to the VPN Router 600, start your Web browser to verify that you can access the gateway from the browser.

To manage the VPN Router 600 using the graphic user interface (GUI), your PC must be running one of the following browsers:

- Windows 2000 and NT
  - Internet Explorer 6.0 or later
  - Mozilla 1.7 or later
  - Firefox (all versions)
  - Netscape 7.x, 8.0.x or 8.1.x
- Unix
  - Firefox 1.5 or later
  - Mozilla 1.7 or later
- Linux
  - Firefox 1.5 or later
  - Mozilla 1.7 or later

To test the management IP address on the VPN Router 600:

1. Open a Web browser.
2. In the URL field, enter **http://** followed by the management IP address that you assigned to the VPN Router 600.

   For example, if the management IP address is 10.2.3.2, enter **http://10.2.3.2**.

   If the Welcome screen appears, you correctly configured the management IP address for the VPN Router 600.

Note: If the Welcome screen does not appear, see "Troubleshooting" on page 50.

3 For information about configuring the VPN Router 600, go to *Nortel VPN Router Configuration — Basic Features* (NN46110-500).

Troubleshooting

If you cannot connect to the VPN Router 600 using your browser, check the following items:

- Ensure that you entered the correct IP address in the browser window.
- Type a known URL in the browser window to make sure that your network connection is good.
- Check that the management IP address that you configured is on the same subnet as the physical LAN attached to the gateway.
- Ensure that your PC is running a supported browser (see"Testing the configuration" on page 49).
- Check the physical connections on the VPN Router 600, especially the LAN cable and the power cord.

If you still cannot connect to the VPN Router 600 using a browser, connect a terminal or PC to the gateway with the serial cable and check the management IP address listed in the serial menu (see "Configuring the management IP address" on page 45). Reconfigure the management IP address if necessary.

If you cannot resolve the problem, contact the Nortel Technical Solutions Center closest to you (see "How to get help" on page 17).

Chapter 4
Installing option cards and DIMMs

This chapter provides instructions on how to install and replace the following field replaceable units (FRU) in the VPN Router 600:

- LAN, WAN, and serial interface cards
- Dual inline memory module (DIMM)

To install an interface card or DIMM, you must remove the VPN Router 600 chassis from its steel enclosure.

This chapter contains the following topics:

Topic	Page
Shutting down the system to add or replace hardware	52
Opening the Nortel VPN Router 600	52
Installing and replacing an option card	56
Replacing a DIMM	61

Shutting down the system to add or replace hardware

Shut down the VPN Router 600, and unplug it to install or replace an option card or to replace the DIMM.

To shut down the VPN Router 600:

1. Use the Web graphic user interface (GUI) or the command line interface (CLI) to shut down the gateway.
   - Web GUI: Choose Admin > Shutdown. Select the option to power off the gateway after shutdown.
   - CLI: Use the **`reload`** command to shut down the system. For example, enter **`reload power-off disable-logins "Upgrade hardware"`** (for the complete syntax of the **`reload`** command, see the *Nortel VPN Router Using the Command Line Interface* (NN46110-507).
2. Wait for the system to shut down. You need to wait several minutes.
3. Remove all interface cables from the rear of the chassis.
4. Disconnect the power cord from the power outlet.
5. Disconnect the power supply cable from the VPN Router 600 DC input port.

Warning: Risk of electric shock
Turn off the VPN Router 600 and unplug it before you attempt to remove or install an option card or DIMM.

Opening the Nortel VPN Router 600

To install an interface card or to replace the DIMM, you must remove the VPN Router 600 chassis from its steel enclosure.

To access the chassis:

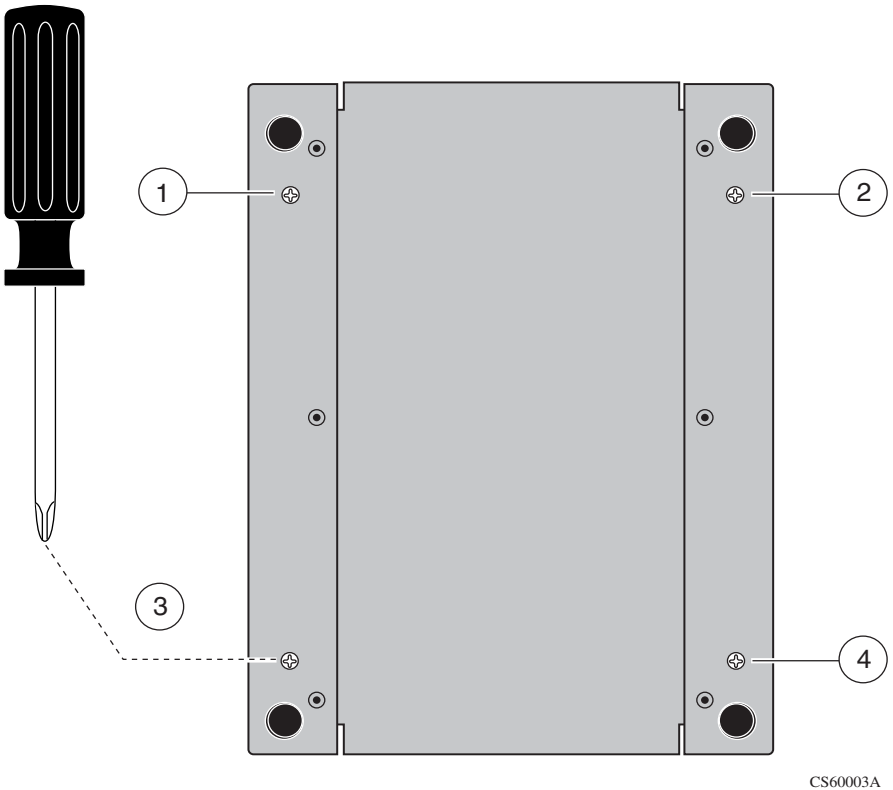
1 Shut down the VPN Router 600, and then unplug it as described in "Shutting down the system to add or replace hardware" on page 52.

Warning: Risk of electric shock
Turn off the VPN Router 600 and unplug it before you attempt to remove or install an option card or DIMM.

2 Turn the VPN Router 600 over to see the bottom of the gateway.

3 Use a Phillips screwdriver to remove the four screws that secure the bottom to the chassis (Figure 11).

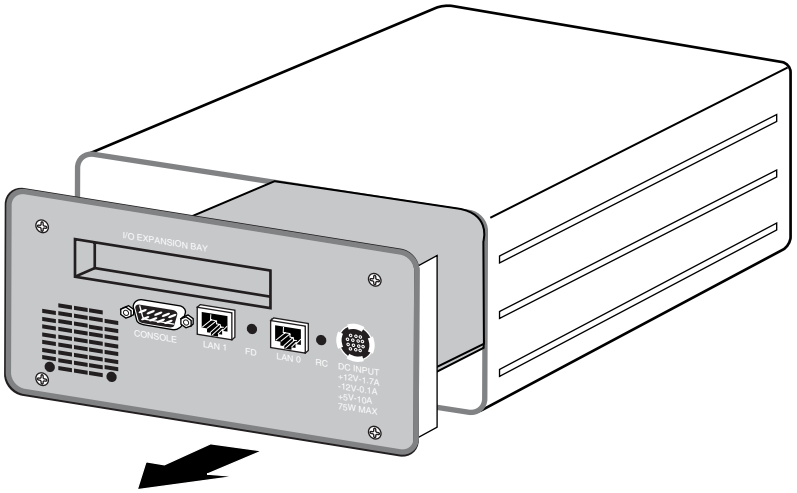
Figure 11 Removing the screws from the bottom of the VPN Router 600



4 Grasp the rear of the chassis, and firmly pull the chassis toward you to loosen the chassis from the steel enclosure (Figure 12).

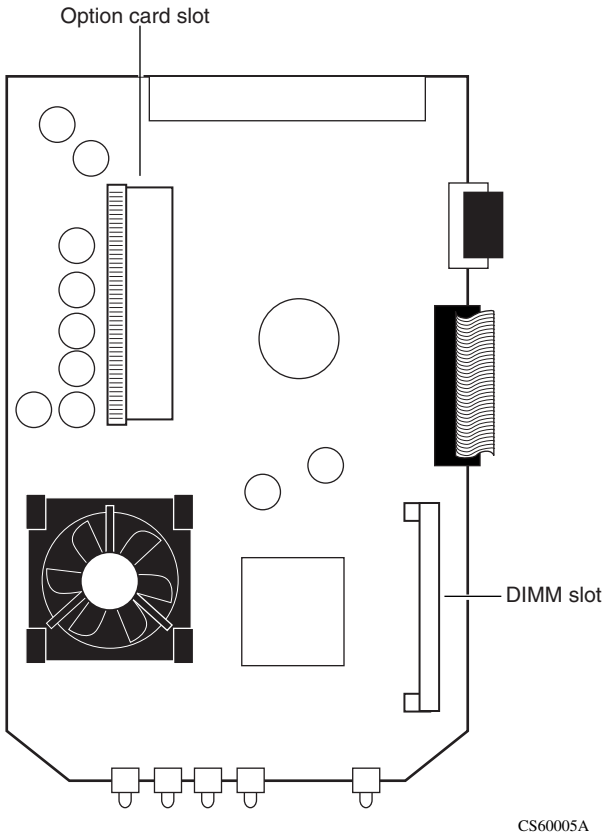
You can gently shake the chassis so that it slips outward and into your hand, or you can pull gently on the I/O expansion bay.

Figure 12 Removing the chassis from the steel enclosure



The system board is now exposed. Figure 13 on page 55 shows the location of the option card slot and the DIMM slot on the VPN Router 600 system board.

Figure 13 VPN Router 600 system board



Warning: Risk of injury
Beware of danger if you incorrectly replace the battery. Replace the battery with the same type or an equivalent battery only, as recommended by the manufacturer's instructions. In spite of this warning, which is mandated for regulatory approval, you must not change the battery. If you suspect a dead battery, contact Nortel Customer Support.

Installing and replacing an option card

The VPN Router 600 has one expansion slot for option cards (Figure 13 on page 55). This section provides instructions on installing a LAN, WAN, or serial option card in the VPN Router 600 or, if necessary, replacing the installed card.

You can install the following option cards in the VPN Router 600:

Note: The 1000BASE-T (1000 GT) Ethernet interface card only operates at 10/100 Mbit/s on the VPN Router 600.

.

Table 12 Supported option cards for the Nortel VPN Router 600 600

Option card	Maximum number
10/100BASE-TX Ethernet interface	1
1000BASE-T (1000 GT) Ethernet interface[1]	1
56/64K channel service unit/digital service unit (CSU/DSU) WAN interface[2]	1
Asymmetric digital subscriber line (ADSL) WAN interface[3]	1
Integrated Services Digital Network (ISDN) BRI S/T or U interface[4]	1
T1 CSU/DSU WAN interface (full-height)	1
T1/E1 CSU/DSU WAN interface (half-height)	1
V.90 modem interface[5]	1
Single V.35/X.21 WAN interface (full-height)	1
Single V.35/X.21 WAN interface (half-height)[6]	1

1 The VPN Router 600 must be running Version 5.05.330, 6.05.140 and later, 7.00.062, 7.05.100 and later, or 7.05.300 and later. The VPN Router 600 supports 10/100 Mbps operation only.

2 The VPN Router 600 must be running Version 5.0 or later.

3 The VPN Router 600 must be running Version 4.90 or later.

4 The VPN Router 600 must be running Version 4.80 or later.

5 The VPN Router 600 must be running Version 4.80 or later.

6 The VPN Router 600 must be running Version 4.80 or later.

To install or replace a LAN, WAN, or serial interface card:

1 Shut down the VPN Router 600 using the Web GUI or the CLI, and then unplug it as described in "Shutting down the system to add or replace hardware" on page 52.

Warning: Risk of electric shock
Turn off the VPN Router 600 and unplug it before you attempt to install an option card.

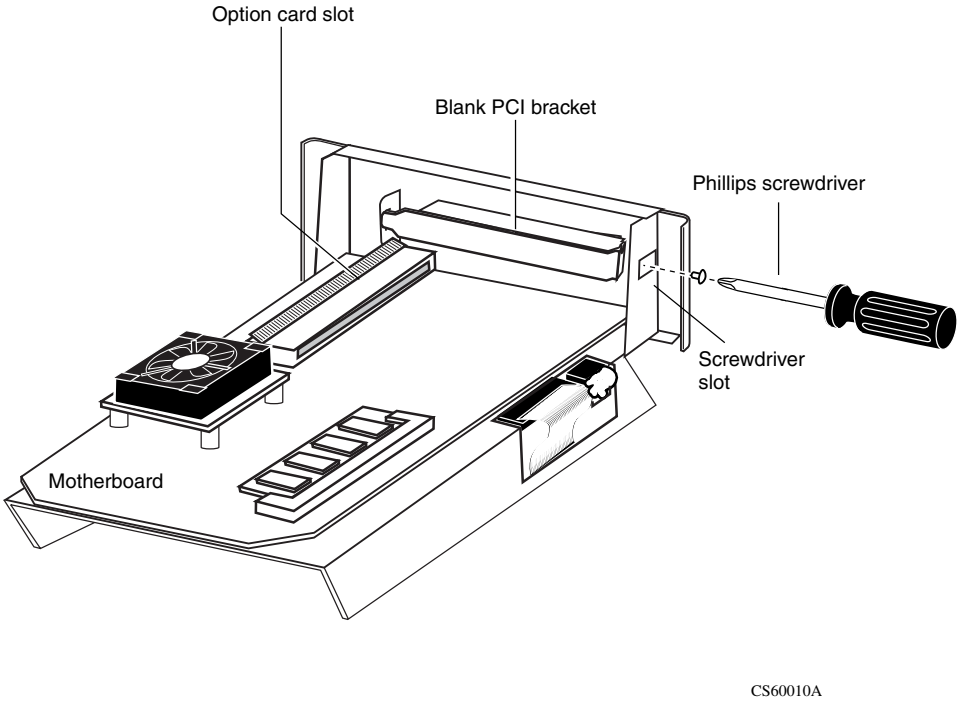
2 Remove the chassis from the steel enclosure (see "Opening the Nortel VPN Router 600" on page 52).

3 Attach an antistatic wrist strap.

Caution: Risk of equipment damage
Electrostatic discharge can damage VPN Router 600 components.

4 Remove the blank PCI bracket by inserting a Phillips screwdriver into the slot at the right of the blank PCI bracket and rotating the screw counterclockwise (Figure 14).

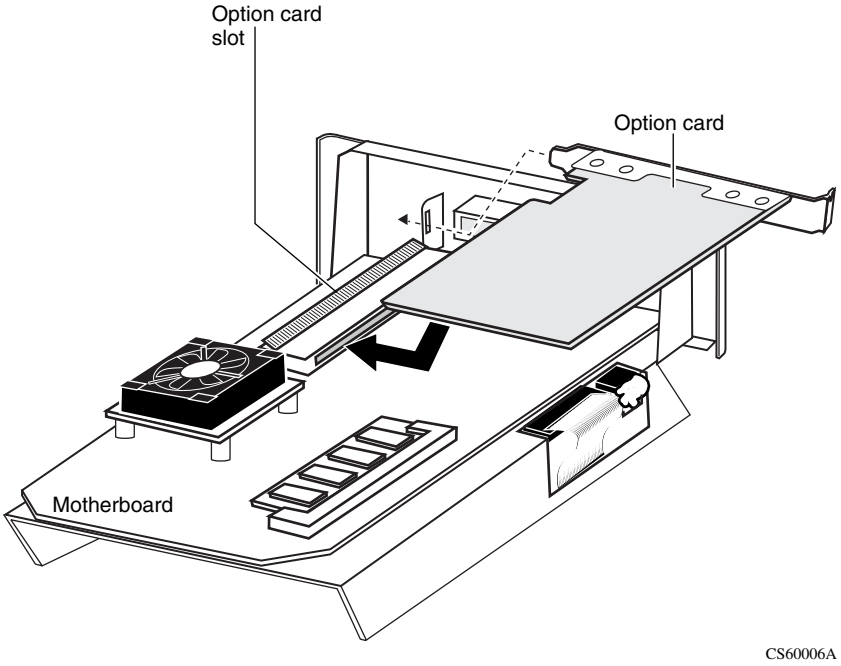
Figure 14 Removing the blank bracket from the option card slot



5 Slide the option card into the option card slot (Figure 15 on page 59).

Do not bend the copper fingers in the slot.

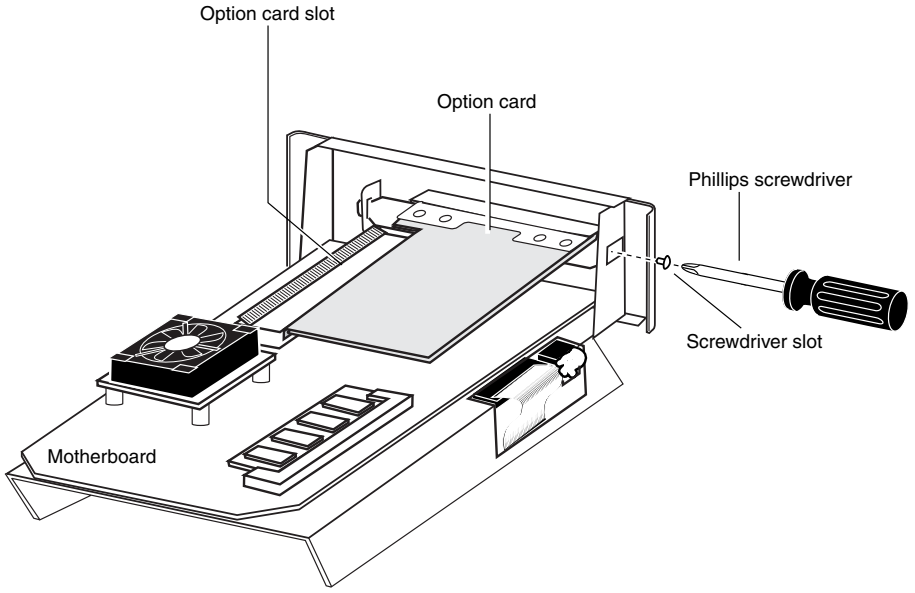
Figure 15 Inserting the option card



Seat the option card firmly and evenly in the card slot with the left tabbed end of the card seated in the card slot. If you do not seat the card properly, it does not work.

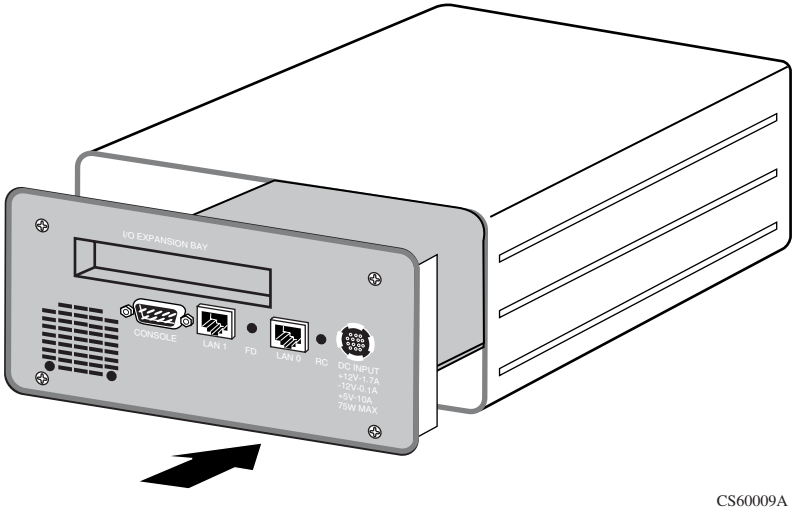
6 Replace the screw at the right end of the PCI bracket (Figure 16 on page 60).

Figure 16 Securing the option card in the slot



7 Slide the chassis into the steel enclosure (Figure 17).

Figure 17 Replacing the chassis in the steel enclosure



8 Replace the four Phillips screws that secure the bottom panel to the chassis (Figure 11 on page 53).

9 Connect the cables to the system ports and to the option card port.

10 Plug the cable attached to the external power supply into the receptacle labeled “DC Input” on the rear of the VPN Router 600.

11 Plug the female end of the power cord into the external power supply pack if necessary.

12 Plug the male end of the power cord into a surge protector

13 Plug the surge protector into the power outlet.

The VPN Router 600 begins to boot.

Note: The VPN Router 600 has no power switch. Connecting the VPN Router 600 to a power supply turns the gateway on.

Replacing a DIMM

The VPN Router 600 has one slot for a dual inline memory module (DIMM). If you have a VPN Router 600 with a 64 MB DIMM, you can upgrade system memory by replacing the installed DIMM with a 128 MB DIMM.

Note: Nortel ships newer VPN Router 600 gateways with 128 MB of memory installed. If you purchased your VPN Router 600 after January 2002, your gateway has 128 MB of memory.

Caution: Use of a memory module not purchased from Nortel can render void your warranty or your service contract.

To replace the DIMM in the VPN Router 600:

1 Shut down the VPN Router 600 using the Web GUI or the CLI, and then unplug it as described in "Shutting down the system to add or replace hardware" on page 52.

Warning: Risk of electric shock
Turn off the VPN Router 600 and unplug it before you attempt to replace the DIMM.

2 Remove the chassis from the steel enclosure (see "Opening the Nortel VPN Router 600" on page 52).

3 Attach an antistatic wrist strap.

Caution: Risk of equipment damage
Electrostatic discharge can damage VPN Router 600 components.

4 Locate the DIMM slot on the system board (Figure 13 on page 55).

5 Pull the locking levers back to release the DIMM.

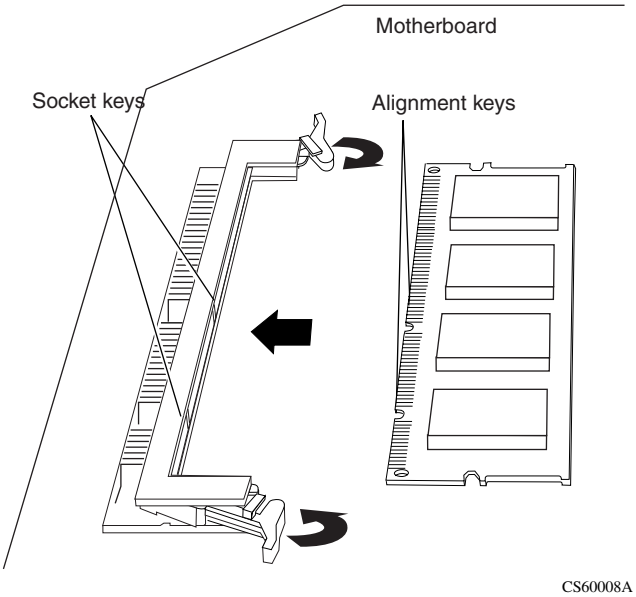
The DIMM snaps up from the circuit board.

6 Pull the DIMM out of the slot.

7 Insert the new DIMM into the slot at a 45 degree angle (Figure 18).

Use the alignment keys on the DIMM to properly position the DIMM in the connector.

Figure 18 Installing a DIMM



8 Gently press down on the DIMM until the locking levers lock it into position.

9 Slide the chassis into the steel enclosure (Figure 17 on page 60).

10 Replace the four Phillips screws that secure the bottom panel to the chassis (Figure 11 on page 53).

11 Connect the cables to the system ports and to the option card port.

12 Plug the cable attached to the external power supply into the receptacle labeled “DC Input” on the rear of the VPN Router 600.

13 Plug the female end of the power cord into the external power supply pack if necessary.

14 Plug the male end of the power cord into a surge protector

15 Plug the surge protector into the power outlet.

The VPN Router 600 begins to boot.

Note: The VPN Router 600 has no power switch. Connecting the VPN Router 600 to a power supply turns the gateway on.

Chapter 5
Using recovery mode

The VPN Router 600 does not have a floppy disk drive, so the software image is built into the onboard flash operating system. Recovery mode on the VPN Router 600 is also built into the flash operating system. You use recovery mode to restore software to a VPN Router 600.

Some Web pages refer to “the recovery diskette” or “the diskette.” In the case of the VPN Router 600, “the diskette” is a virtual diskette. In all other respects, recovery mode on a VPN Router 600 works the same way that it does on VPN Routers that have floppy disk drives.

Note: In addition, the VPN Router 600 does not have a Reset button. If you need to reset a VPN Router 600, you remove power from the gateway and then restore power.

To enter recovery mode:

1. Plug in the console cable, the LAN 0 cable, and the DC input cable from the VPN Router 600 power supply (Figure 2 on page 31).
2. Start HyperTerminal (or another terminal emulation program) on your PC and connect to the console port of the VPN Router 600.
3. Apply AC power to the power supply.
4. Press the RC (recovery) switch on the rear of the VPN Router 600 by inserting a paper clip into the hole marked “RC” on the rear of the chassis (Figure 2 on page 31). The RC switch is located between the LAN 0 cable and the DC input cable.

On your console you can see the BIOS banner and the Nortel VPN Router banner. Then, you observe the unit execute its power-on self-test. You can press the switch anytime during the power tests. A momentary press is all that is required. You do not need to hold the button down.

Note: After the console completes the power-on self-test, it displays the message `Booting recovery image`.

Booting the recovery image takes approximately 40 seconds. After the recovery image boots, the VPN Router 600 displays the welcome message, the recovery image version, and a prompt for you to enter the administrator's user name. At this point, you are in recovery mode.

5 Enter a management IP address, subnet mask, and gateway if they are not already assigned. You do this from the console menu after logging in as an administrator.

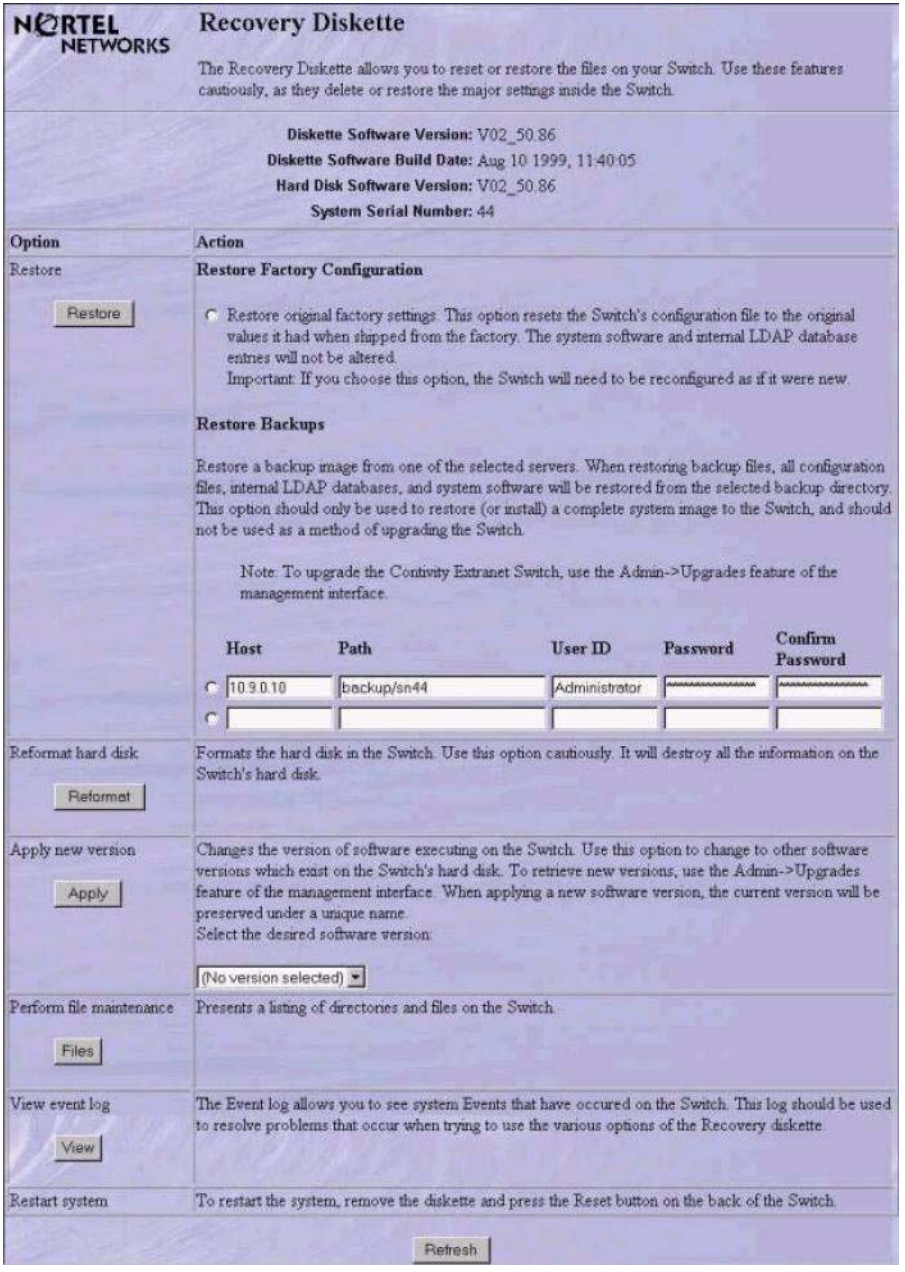
When the unit has a management IP address, you can manage the unit from the Web interface.

Note: The switch marked FD is reserved for future use. Pressing this switch has no effect.

From the Web browser, enter the management IP address of the VPN Router 600. The Recovery Diskette screen appears (Figure 19 on page 67). From this screen, you can perform the following tasks:

- Restore the factory default configuration or the backup configuration.
- Reformat the hard disk of the VPN Router 600.
- Apply a new software version to the VPN Router 600.
- Perform file maintenance.
- View the Event log.
- Restart the system.

Figure 19 Recovery Diskette screen


NORTEL NETWORKS
Recovery Diskette
The Recovery Diskette allows you to reset or restore the files on your Switch. Use these features cautiously, as they delete or restore the major settings inside the Switch.
Diskette Software Version: V02_50.86
Diskette Software Build Date: Aug 10 1999, 11:40:05
Hard Disk Software Version: V02_50.86
System Serial Number: 44
Option
Action
Restore
Restore
Restore Factory Configuration
Restore original factory settings. This option resets the Switch's configuration file to the original values it had when shipped from the factory. The system software and internal LDAP database entries will not be altered.
Important: If you choose this option, the Switch will need to be reconfigured as if it were new.
Restore Backups
Restore a backup image from one of the selected servers. When restoring backup files, all configuration files, internal LDAP databases, and system software will be restored from the selected backup directory. This option should only be used to restore (or install) a complete system image to the Switch, and should not be used as a method of upgrading the Switch.
Note: To upgrade the Contivity Extranet Switch, use the Admin->Upgrades feature of the management interface.
Host
Path
User ID
Password
Confirm Password
10.9.0.10
backup/sn44
Administrator
Reformat hard disk
Reformat
Formats the hard disk in the Switch. Use this option cautiously. It will destroy all the information on the Switch's hard disk.
Apply new version
Apply
Changes the version of software executing on the Switch. Use this option to change to other software versions which exist on the Switch's hard disk. To retrieve new versions, use the Admin->Upgrades feature of the management interface. When applying a new software version, the current version will be preserved under a unique name.
Select the desired software version:
(No version selected)
Perform file maintenance
Files
Presents a listing of directories and files on the Switch.
View event log
View
The Event log allows you to see system Events that have occured on the Switch. This log should be used to resolve problems that occur when trying to use the various options of the Recovery diskette.
Restart system
To restart the system, remove the diskette and press the Reset button on the back of the Switch.
Refresh

1 Restore the configuration:

To restore the factory default configuration or the backup configuration, do one of the following:

- Restore the factory default configuration by selecting Restore Factory Configuration, then clicking Restore to return the VPN Router 600 to its original factory default configuration. This option erases data contained in flash memory and also in the configuration file.

Caution: Risk of configuration loss
If you select this option, you must rebuild your entire configuration again from scratch

A message specifies the result of the Factory Configuration reset action.

- Or, you can restore the gateway's previously backed-up configuration by clicking Restore. If you previously chose to automatically back up the file systems, then the Backup Server Host (or IP address) and Path Name, User ID, and Password appear in the table.

  Choose the Partial Backup option to restore the configuration files, log files, or system files from a partial backup.

  Click the radio button of the preferred backup server. The backed-up file system, including software image and configuration files, from the latest backup copy residing on the designated server is restored onto the hard drive of your gateway.

  You can use the same backup server for multiple gateways. Each gateway creates a unique directory based on its serial number. The following example shows the host, path, and serial number:

  ```
  C:/software/backup/v101/SN01001
  ```

  The serial number differentiates backup configurations from multiple gateways that are saved on the same backup server. The serial number uniquely identifies each gateway's backup data.

  A blank row in the server backup field always appears to allow you to manually enter a backup server in case you did not configure automatic backup server locations.

- Alternatively, you can restore a new factory default software image and file system to the VPN Router 600 hard disk. Specify the name or address and path of the network file server onto which the software from the Nortel CD has been installed.

Note: This option restores the disk to an operable but "clean" condition (for example, configuration values are at factory defaults).

To view your gateway's serial number when the gateway is operational, click Status > System from the navigational menu. The serial number is also listed on the bar code label on the back of the gateway.

2 Click Reformat your Switch's Hard Disk if you must reformat the hard disk, for example if you:

— Have problems restoring your configuration that are not caused by the network or the file/backup server from which the file restoration is being retrieved.

— Want to reconfigure the VPN Router 600 from scratch.

Caution: Risk of data loss
If you select this option, you erase all information that previously resided on the hard disk.

A message indicates whether the reformatting of the hard disk was successful.

3 Click the list box to view the available software image and file systems that are stored on the remote disk and select the image version that you want to activate.

4 Click Files to display the File Maintenance screen, which allows you to view the entire hard disk file system.

5 Click View to display the Event Log beneath the Recovery Diskette display. This is especially useful if a Restore operation fails.

6 Reset the system after recovery operation by unplugging the unit. Either AC or DC power may be interrupted momentarily to accomplish this. Then reposition your Web browser to the management IP address, and press Reload or Refresh from your browser menu to access the management page of the software running on the hard disk.

Appendix A
Technical specifications

This appendix provides technical specifications for the VPN Router 600 chassis and its interfaces.

Chassis specifications

Table 13 lists physical, electrical, and environmental specifications for the chassis.

Table 13 Physical, electrical, and environmental specifications

Specification	Description
Physical	
Height	4 in. (10.16 cm)
Width	8 in. (20.32 cm)
Depth	10.75 in. (27.30 cm)
Weight	7 lbs. (3.175 kg)
Electrical	
Voltage	100–240 VAC
Current	1.9 A
Frequency	47–63 Hz
Environmental	
Operating temperature	32–110°F (0–45°C)
Relative humidity	10–90% noncondensing

System ports

The VPN Router 600 system board provides the following built-in interfaces:

- 10/100BASE-TX Ethernet LAN ports
- Serial port

This section provides information about the 10/100BASE-TX Ethernet LAN ports and the serial port on the system board.

10/100BASE-TX Ethernet LAN port

The system board provides two 10/100BASE-TX Ethernet LAN interfaces on the rear of the chassis. (LAN 0 is generally used for Web management, and LAN 1 is generally used as a public LAN.) These interfaces accommodate an RJ-45 straight- through cable. Depending on whether you use the interface for 10BASE-T or 100BASE-TX operation, select cables for the interface as follows:

- 100BASE-TX connections require Category 5 twisted-pair wire. The 100BASE-TX specification supports 100 Mb/s transmission over two pairs of Category 5 twisted-pair Ethernet wiring: one pair each for transmit and receive operations.

  Nortel recommends a maximum length of 100 meters for the cable segment between a 100BASE-TX repeater and a workstation (due to signal timing requirements). This wiring scheme complies with the EIA 568 wiring standard.

- 10BASE-T connections can use Category 3, 4, or 5 twisted-pair wiring.

Figure 20 on page 73 shows the 10/100BASE-TX Ethernet connector and its pinouts.

Figure 20 10/100BASE-TX Ethernet connector

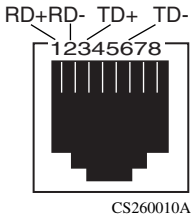


Table 14 provides the 10/100BASE-TX Ethernet port pinouts.

Table 14 10/100BASE-TX Ethernet port pinouts

Pin	Description
1	RD +
2	RD -
3	TD +
6	TD -

Serial port

The system board provides a serial port on the rear of the chassis to enable out-of-band management. Using the serial port, you can assign the management IP address and subnet mask to the newly installed gateway (for more information, see Chapter 3, “Configuring the management IP interface,” on page 43).

The serial cable provided with the VPN Router 600 is a DB9/DB25-to-DB9/DB25 cable. This cable provides a crossover connection (transmit-to-receive and receive-to-transmit). The DB9 connector goes into the gateway and the other DB9 or DB25 connector goes into your workstation (Figure 21 on page 74).

Figure 21 Serial cable (9-pin D-sub plug to RS-232-C modem plug)

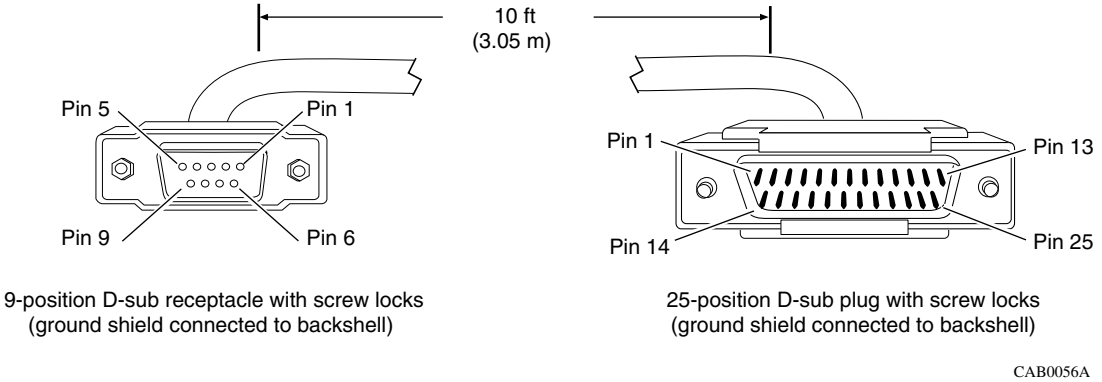


Table 15 provides the multiple DB9/DB25 serial interface cable pinouts.

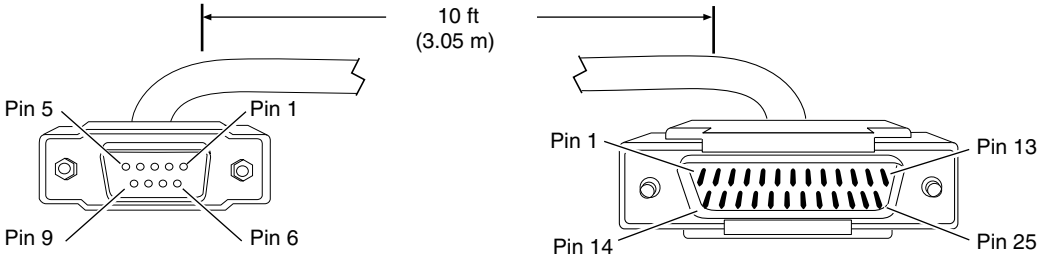
Table 15 Multiple DB9 and DB25 connector pinouts

Serial port DB9 connector		**Serial port DB25 connector**			**Serial port DB25 connector**		**Serial port DB9 connector**	
Pinout	Signal	Pinout	Signal		Pinout	Signal	Pinout	Signal
2	RXD	3	TXD	>	2	RXD	3	TXD
3	TXD	2	RXD	>	3	TXD	2	RXD
4	DTR	20	DSR	>	6	DTR	6	DSR
5	Ground	7	Ground	>	7	Ground	5	Ground
6	DSR	6	DTR	>	20	DSR	4	DTR
7	RTS	4	RTS	>	5	CTS	8	CTS
8	CTS	5	CTS	>	4	RTS	7	RTS

Modem cable specifications

If you need to connect a modem to a VPN Router 600, you must obtain an appropriate modem cable. The modem cable must have a 9-pin D-sub plug that connects to the VPN Router 600 serial port and a 25-pin D-sub plug that connects to the RS-232-C modem port (Figure 22).

Figure 22 Modem cable (9-pin D-sub plug to RS-232-C modem plug)



9-position D-sub receptacle with screw locks (ground shield connected to backshell)

25-position D-sub plug with screw locks (ground shield connected to backshell)

CAB0056A

Table 16 provides the modem cable pinouts.

Table 16 Modem cable pinouts

Nortel termination		**Modem termination**	
Signal	**Pin # to Pin #**		**Signal**
Data Carrier Detect	1	8	Data Carrier Detect
Transmit Data (TXD)	2	2	Transmit Data (TXD)
Receive Data (RXD)	3	3	Receive Data (RXD)
Data Set Ready	4	6	Data Set Ready
Data Terminal Ready	6	20	Data Terminal Ready
Clear to Send	7	5	Clear to Send
Request to Send	8	4	Request to Send

Hardware option cards

The VPN Router 600 has one expansion PCI slot that supports any of the following option cards:

- 10/100BASE-TX Ethernet interface card
- 1000BASE-T (1000 GT) Ethernet interface card
- 56/64K CSU/DSU WAN interface card
- ADSL WAN interface card
- ISDN BRI S/T or U interface card
- T1 CSU/DSU WAN interface card (full-height card)
- T1/E1 CSU/DSU WAN interface card (half-height card)
- Single V.35/X.21 WAN interface card
- V.90 modem interface card

This section provides information about the option cards, including the connector and the cable pinouts for each supported network interface card. For instructions on installing an option card, see Chapter 4, “Installing option cards and DIMMs,” on page 51.

10/100BASE-TX Ethernet interface card

The 10/100BASE-TX Ethernet interface card has a single RJ-45 connector that provides the signals needed to interface to 10BASE-T and 100BASE-TX Ethernet equipment.

Figure 23 shows the 10/100BASE-TX Ethernet interface card.

Figure 23 10/100BASE-TX Ethernet interface card

For information about the cables that you can connect to this interface and the cable pinouts, see “10/100BASE-TX Ethernet LAN port” on page 72.

1000BASE-T (1000 GT) Ethernet interface card

The 1000BASE-T (1000 GT) Ethernet card replaces the 10/100BASE-TX Ethernet card (see the previous section). This card provides 10/100/1000 Mbit/s Ethernet services and supports autonegotiation. The card supports the IEEE 802.3ab standard and provides RJ-45/CAT 5 interconnection. It can operate in either full or half duplex mode at 10/100 Mbit/s, and in full duplex mode at 1 Gbit/s. At 1 Gbit/s, autonegotiation must be used.

Note: The 1000BASE-T (1000 GT) Ethernet interface card can only operate at 10/100 Mbit/s on the VPN Router 600.

The VPN Router 600, 1100, 1600 and 2600 only support 10/100 Mbit/s operation for the 1000BASE-T (1000 GT) Ethernet card. To ensure reliable speed/duplex operation on these platforms, Nortel recommends that both the interface and the attached devices are hard-coded to the appropriate matching 10/100 speed and duplex settings.

For the 1000BASE-T (1000 GT) Ethernet interface card to be recognized by the system, the minimum required VPN Router operating software is:

- 5.05.330
- 6.05.140 and all subsequent versions
- 7.00.062
- 7.05.100 and all subsequent versions (FIPS branch)
- 7.05.300 and all subsequent versions

The following figure shows the 1000BASE-T (1000 GT) Ethernet interface full-height card for VPN Router.

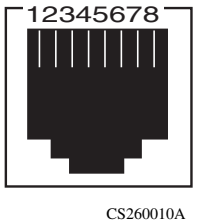
Figure 24 1000BASE-T (1000 GT) Ethernet interface card

Select cables for this card as follows. Keep in mind that this card is auto-negotiating and uses the highest possible data rate:

- For 100BASE-TX operation, use Category 5 twisted-pair wiring: one pair each for transmit and receive operations. The cable must comply with the EIA 568 wiring specification. Nortel recommends a maximum length of 100 meters for the cable segment.
- For 10BASE-T operation, use Category 3, 4, or 5 twisted-pair wiring.

The following table provides the pinouts for the 1000BASE-T (1000 GT) Ethernet interface card..

Table 17 1000BASE-T (1000 GT) Ethernet pinouts

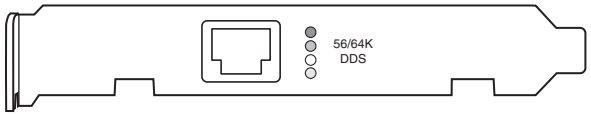


Pin	Description
1	TP0+
2	TP0-
3	TP1+
4	TP2+
5	TP2-
6	TP1-
7	TP3+
8	TP3-

56/64K CSU/DSU WAN interface card

The 56/64K CSU/DSU WAN interface card has a single RJ-48 connector that provides the signals needed to interface to network equipment. Figure 25 shows the 56/64K CSU/DSU WAN interface card.

Figure 25 56/64K CSU/DSU WAN interface card



The connector on the 56/64K CSU/DSU WAN interface card accommodates an 8-pin RJ-48 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.

Note: Nortel does not supply an interface cable with the 56/64K CSU/DSU WAN interface card.

Use cable that is wired in accordance with EIA-568-A wiring style. This wiring style ensures that a twisted pair inside the patch cord carries the transmit signal (pins 1 and 2) and the receive signal (pins 7 and 8). Nortel recommends that you use factory-made patch cords.

You connect the 56/64K CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. Do not interchange the 56/64K CSU/DSU crossover cable and the Ethernet crossover cable.

Table 18 on page 79 provides the 56/64K CSU/DSU cable pinouts for a crossover connection.

Table 18 56/64K CSU/DSU cable pinouts for crossover connection

Nortel termination		**Remote termination**	
Signal	**Pin # to Pin #**		**Signal**
Transmit tip	1	7	Receive tip
Transmit ring	2	8	Receive ring

Table 18 56/64K CSU/DSU cable pinouts for crossover connection

Nortel termination		Remote termination	
not used	3	3	not used
not used	4	4	not used
not used	5	5	not used
not used	6	6	not used
Receive tip	7	1	Transmit tip
Receive ring	8	2	Transmit ring

The cable operates properly if you do not connect pins 3, 4, 5, and 6.

Caution: For crossover connections, do not use Ethernet cable. If you use Ethernet cable, the link cannot be established.

Table 19 provides the 56/64K CSU/DSU cable pinouts for a straight-through connection.

Table 19 56/64K CSU/DSU cable pinouts for straight-through connection

Nortel termination		Remote termination	
Signal	**Pin # to Pin #**		**Signal**
Transmit tip	1	1	Transmit tip
Transmit ring	2	2	Transmit ring
not used	3	3	not used
not used	4	4	not used
not used	5	5	not used
not used	6	6	not used
Receive tip	7	7	Receive tip
Receive ring	8	8	Receive ring

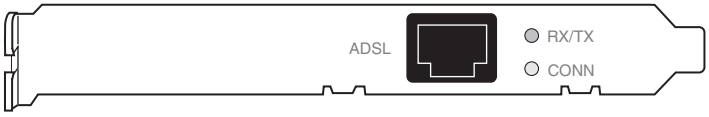
ADSL WAN interface card

The ADSL Annex A and Annex B WAN interface cards have a single RJ-11 connector that provides the signals needed to interface to the digital subscriber line access multiplexer (DSLAM) and to telephone equipment.

Figure 26 shows the ADSL WAN interface card.

Note: The ADSL Annex A and ADSL Annex B cards look identical.

Figure 26 ADSL WAN interface card



Included in the accessory box is a 7-foot RJ-11 cable to attach to the DSLAM.

Table 20 provides the ADSL port pinouts.

Table 20 ADSL cable pinouts

Pin	Function
1	N/C
2	Tip
3	Ring
4	N/C

ISDN BRI interface card

The ISDN BRI S/T and ISDN BRI U interface cards have a single RJ-45 connector that provides the signals needed to interface to ISDN equipment. (To connect the ISDN S/T interface to the ISDN network, you must attach an external NT-1 device to the RJ-45 connector.)

Figure 27 shows the ISDN BRI S/T interface card and the ISDN BRI U interface card. The two cards look identical.

Figure 27 ISDN BRI S/T interface card and ISDN BRI U interface card

The connector on the ISDN BRI S/T and ISDN BRI U interface cards accommodates an 8-pin RJ-45 modular patch cord. These cables are commonly sold as Category 5, or Ethernet, cables.

Note: Nortel does not supply a cable with the ISDN BRI interface cards.

Table 21 provides the ISDN BRI S/T cable pinouts.

Table 21 ISDN BRI S/T cable pinouts

Pin	Function
1	N/C
2	N/C
3	Receive +
4	Transmit +
5	Transmit -
6	Receive -
7	N/C
8	N/C

Table 22 provides the ISDN BRI U cable pinouts.

Table 22 ISDN BRI U cable pinouts

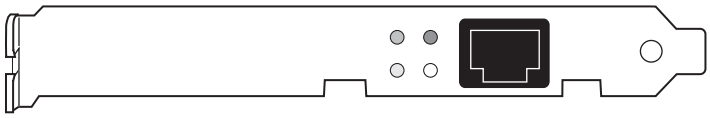
Pin	Function
1	N/C
2	N/C
3	N/C
4	U interface network connection (tip)
5	U interface network connection (ring)
6	N/C
7	N/C
8	N/C

T1/E1 CSU/DSU WAN interface card

The T1/E1 CSU/DSU WAN interface card has a single connector that provides the signals needed to interface to T1 or E1 equipment. This interface card ships as a half-height card and as a full-height card.

Figure 28 shows the T1/E1 CSU/DSU WAN interface card (half-height card).

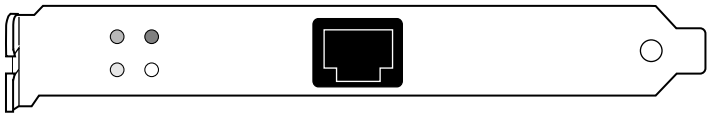
Figure 28 T1/E1 CSU/DSU WAN interface card (half-height card)



Note: For E1 service, you must install the half-height version of the T1/E1 CSU/DSU WAN interface card.

Figure 29 on page 84 shows the T1/E1 CSU/DSU WAN interface card (full-height card).

Figure 29 T1/E1 CSU/DSU WAN interface card (full-height card)



CS160012A

The connector on the T1/E1 CSU/DSU WAN interface card accommodates an 8-pin RJ-48 modular patch cord. These cables are sold as Category 5, or Ethernet, cables.

Note: Nortel does not supply the T1/E1 CSU/DSU WAN interface cable with the WAN interface card.

Use cable that is wired in accordance with EIA-568-A wiring style. This wiring style ensures that the transmit signal (pins 4 and 5) and the receive signal (pins 1 and 2) are carried on a twisted pair inside the patch cord. The use of factory made patch cords is strongly recommended.

You connect the T1/E1 CSU/DSU WAN interface card to the service provider network using a straight-through cable or a crossover cable, depending on how the service provider wired its jack.

- For a straight-through connection, you can use a standard Category 5 (Ethernet) straight-through cable.
- For a crossover connection, you cannot use a standard Category 5 crossover cable. The T1/E1 CSU/DSU crossover cable and the Ethernet crossover cable are not interchangeable.

Table 23 provides the T1/E1 CSU/DSU cable pinouts for a crossover connection.

Table 23 T1/E1 CSU/DSU cable pinouts for crossover connection

Standard-wired end 8-pin male	Signal name	Pair number and conductor	Special-wired end 8-pin male
1	RXDA<-TXDA	wht/org pair 2A	5
2	RXDB<-TXDB	orange pair 2B	4
3	not used	wht/grn pair 3A	3
4	TXDB->RXDB	blue pair 1B	2

Table 23 T1/E1 CSU/DSU cable pinouts for crossover connection

Standard-wired end 8-pin male	Signal name	Pair number and conductor	Special-wired end 8-pin male
5	TXDA->RXDA	wht/blu pair 1A	1
6	not used	green pair 3B	6
7	not used	wht/brn pair 4A	7
8	not used	brown pair 4B	8

The cable operates properly if you do not connect pins 3, 6, 7, and 8.

Caution: For crossover connections, do not use Ethernet cable. If you use Ethernet cable, the T1/E1 CSU/DSU does not work to specifications, and these conditions can corrupt the data.

Table 24 provides the T1/E1 CSU/DSU cable pinouts for a straight-through connection.

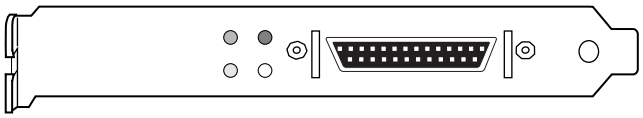
Table 24 T1/E1 CSU/DSU cable pinouts for straight-through connection

Nortel termination		Remote termination	
Signal	**Pin # to Pin #**		**Signal**
Receive A (RXDA)	1	1	Receive A (RXDA)
Receive B (RXDB)	2	2	Receive B (RXDB)
not used	3	3	not used
Transmit B (TXDB)	4	4	Transmit B (TXDB)
Transmit A (TXDA)	5	5	Transmit A (TXDA)
not used	6	6	not used
not used	7	7	not used
not used	8	8	not used

Single V.35/X.21 WAN interface card

The single V.35/X.21 WAN interface card has a single DB28S connector that provides the signals needed to interface to V.35 and X.21 equipment. Figure 30 shows the single V.35/X.21 WAN interface card.

Figure 30 Single V.35/X.21 WAN interface card



You need a DSU/CSU (digital service unit/channel service unit) between the WAN connection and the gateway. You can order a V.35 or X.21 cable to attach to the connector. This cable enables the WAN adapter to function as DTE (data terminal equipment).

Table 25 provides the V.35 cable pinouts. Table 26 on page 88 provides the X.21 cable pinouts. (The pair suffix A or B refers to an individual wire within a twisted pair.)

Table 25 V.35 cable pinouts

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male	Notes
2	TXDA	pair 1A	P	
14	TXDB	pair 1B	S	
3	RXDA	pair 2A	R	
16	RXDB	pair 2B	T	
15	TXCA	pair 3A	Y	
12	TXCB	pair 3B	AA	
17	RXCA	pair 4A	V	
9	RXCB	pair 4B	X	
24	SCTEA	pair 5A	U	
11	SCTEB	pair 5B	W	
4	RTSA	pair 6A	C	
19	RTSB	pair 6B	no conn	Note 1

Table 25 V.35 cable pinouts (continued)

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Special-wired end 34-pin male	Notes
5	CTSA	pair 7A	D	
13	CTSB	pair 7B	no conn	Note 1
6	DSRA	pair 8A	E	
22	DSRB	pair 8B	J	
20	DTRA	pair 9A	H	
23	DTRB	pair 9B	no conn	Note 1
8	DCDA	pair 10A	F	
10	DCDB	pair 10B	no conn	Note 1
18	LL	pair 11A	L	
21	RL	pair 11B	N	
25	TM	pair 12A	NN	
26	M0<-SIGNAL GROUND	pair 12B	B	Note 2
27	M1<-SIGNAL GROUND	pair 13A	B	Note 2
28	M2	pair 13B	no conn	Note 1
1	SHIELD	pair 14A	A	Notes 3,4
7	SIGNAL GROUND	pair 14B	B	Notes 2,4

The following notes apply to the single V.35 DTE cable:

1. The term “no conn” means the wire is not connected to a pin in the 34-pin connector.
2. Wires 12B, 13A, and 14B connect to pin B in the 34-pin connector.
3. At each end, the cable shield and connector shell must connect respectively to pin A of the 34-pin connector and pin 1 of the standard 28-pin connector.
4. Do not connect Shield to Signal Ground because these are separate signals.

Table 26 provides the X.21 cable pinouts. (The pair suffix A or B refers to an individual wire within a twisted pair.)

Table 26 X.21 cable pinouts

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Standard-wired end 15-pin male	Notes
2	TXDA	pair 1A	2	
14	TXDB	pair 1B	9	
3	RXDA	pair 2A	4	
16	RXDB	pair 2B	11	
15	TXCA	pair 3A	6	
12	TXCB	pair 3B	13	
17	RXCA	pair 4A	pair 5A	Note 1
9	RXCB	pair 4B	pair 5B	Note 1
24	SCTEA	pair 5A	pair 4A	Note 1
11	SCTEB	pair 5B	pair 4B	Note 1
4	RTSA	pair 6A	3	
19	RTSB	pair 6B	10	
5	CTSA	pair 7A	5	
13	CTSB	pair 7B	12	
6	DSRA	pair 8A	no conn	Note 2
22	DSRB	pair 8B	no conn	Note 2
20	DTRA	pair 9A	no conn	Note 2
23	DTRB	pair 9B	no conn	Note 2
8	DCDA	pair 10A	no conn	Note 2
10	DCDB	pair 10B	no conn	Note 2
18	LL	pair 11A	no conn	Note 2
21	RL	pair 11B	no conn	Note 2
25	TM	pair 12A	no conn	Note 2
26	M0	pair 12B	no conn	Note 2
27	M1	pair 13A	no conn	Note 2
28	M2<-SIGNAL GROUND	pair 13B	8	Note 3

Table 26 X.21 cable pinouts (continued)

Standard-wired end 28-pin male	Signal name	Pair number and conductor	Standard-wired end 15-pin male	Notes
1	SHIELD	pair 14A	1	Note 4,5
7	SIGNAL GROUND	pair 14B	8	Note 3,5

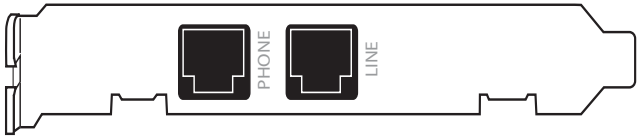
The following notes apply to the single X.21 cable:

1. Wires of pair 4 connect to wires of pair 5, but not to any pins in the DA-15.
2. The term “no conn” means the wire is not connected to a pin in the 15-pin connector.
3. Wires 13B and 14B connect to pin 8 in the 15-pin connector.
4. At each end, the cable shield and connector shell must connect to pin 1 of the connector.
5. Do not interconnect Shield to Signal Ground because these are separate signals.

V.90 modem interface card

The V.90 modem interface card has two RJ-11 connectors that provide the signals needed to interface to an incoming telephone line and to telephone equipment. Figure 31 shows the V.90 modem interface card.

Figure 31 V.90 modem interface card



Included in the accessory box is a 7-foot RJ-11 cable to attach to a telephone jack.

Table 27 provides the V.90 modem port cable pinouts.

Table 27 V.90 modem cable pinouts

Pin	Function
1	N/C
2	Tip
3	Ring
4	N/C

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